[12177-21101]

FIG. 1 PRODUCT CYCLE

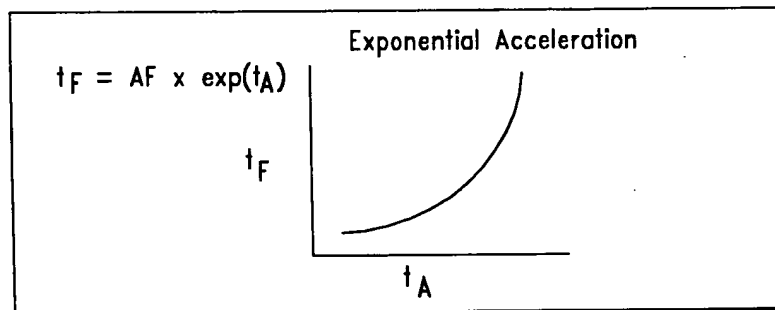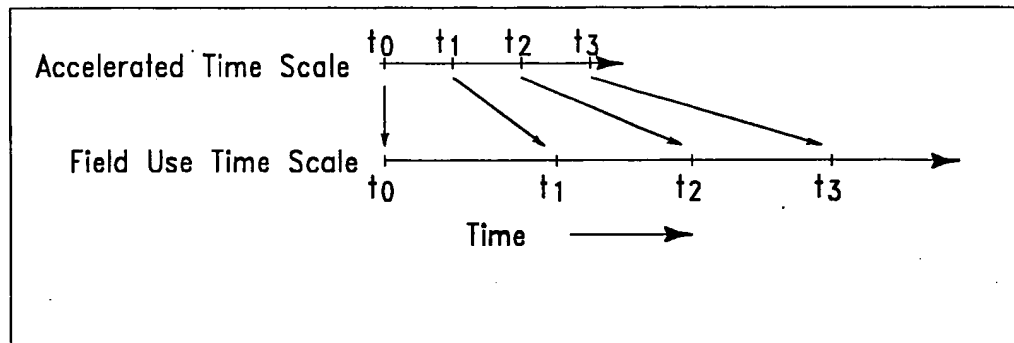$$t_F = AF \times \exp(t_A)$$

Exponential Acceleration

t_F

t_A

FIG. 2 Exponential Acceleration

Correlation between Accelerated and Field Use Time Scales

FIG. 3

Unit A	CSS	HSS	RT	Vib	CE	Average Time to Failure	λ
HALT 1 First Failure (time to failure in hours)	2	1.35	0.23	0.88	0.925	1.077	0.929
HALT 2 First Failure (time to failure in hours)	1.525	1.51	1.05	1.38	1.45	1.383	0.723

$\bar{R}^*$ (see eq. 6)   0.306

$\bar{R}'$ (see eq. 7)   1.36 ← ESTIMATE FOR RELATIVE LIFE R

BOM MTBF   298462
MTBF for Redesigned Unit   405908
(see eq. 12)

VAR $(\bar{R}^*)$=   0.614

90% Confidence Limits for $\bar{R}^*$
(see eq. 10)
          Lower Limit   −0.98
          Upper Limit   1.59

90% Confidence Limits for R
(see eq. 11)
          Lower Limit   0.374
          Upper Limit   4.9000

FIG. 4

Unit B	CSS	HSS	RT	Vib	CE	Average Time to Failure	λ
HALT 1 First Failure (time to failure in hours)	1.23	1.38	1.38	1.48	0.18	1.13	.88
HALT 2 First Failure (time to failure in hours)	2.03	1.38	.225	1.83	.225	1.14	.88

$\bar{R}^*$(see eq. 6)   0.0

$\bar{R}$ (see eq. 7)   1.0 ←—ESTIMATE FOR RELATIVE LIFE R

BOM MTBF   232000

MTBF for Redesigned Unit   232000
(see eq. 12)

VAR $(\bar{R}^*)$=   0.516

90% Confidence Limits for $\bar{R}^*$
(see eq. 10) Lower Limit   −1.18
              Upper Limit   1.18

90% Confidence Limits for R
(see eq. 11) Lower Limit   0.306
              Upper Limit   3.250

FIG. 5

Unit C	CSS	HSS	RT	Vib	CE	Average Time to Failure	λ
HALT 1 First Failure (time to failure in hours)	1.48	1.20	0.55	1.22	0.81	1.05	0.95
HALT 2 First Failure (time to failure in hours)	1.87	1.30	1.67	1.06	0.33	1.25	0.80

$\bar{R}^*$(see eq. 6)   0.20

$\bar{R}$ (see eq. 7)   1.22 ←—ESTIMATE FOR RELATIVE LIFE R

BOM MTBF   363300

MTBF for Redesigned Unit   443226
(see eq. 12)

VAR $(\bar{R}^*)$=   0.53

90% Confidence Limits for $\bar{R}^*$
(see eq. 10) Lower Limit   −.99
              Upper Limit   1.39

90% Confidence Limits for R
(see eq. 11) Lower Limit   0.368
              Upper Limit   4.010

FIG. 6